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AUTHOR Williams, David D.
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ABSTRACT

This paper reports results of an exploratory study designed to identify some of the issues most critical for understanding how naturalistic inqiry is done and why researchers behave as they do. Preliminary results are discussed of an inquiry into ten case studies, The Case Studies in Science Education (CSSE), funded as one project by the National Science Foundation in an effort to understand the current conditions in science classrooms for students in grades K-12. Ten different high schools and their associated junior high and elementary schools were selected to be evaluated qualitatively by field researchers using methods of their choice. Research objectives of this study were to describe what the researchers did to interpret why they chose their particular methods. (CS)

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SEEKING TO UNDERSTAND ACTIVITIES OF NATURALISTIC INQUIRERS A META-CASE STUDY OF THE CASE STUDIES IN SCIENCE EDUCATION

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David D. Williams
David O. McKay Institute of Education
Brigham Young University

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The complex and private nature of naturalistic research methods poses several problems. I will discuss some of the more obvious ones, suggest a general solution, and report on a research project designed to contribute to that solution.

Anthropologists, sociologists and other researchers have employed qualitative or naturalistic methods of inquiry for nearly a century, while educational researchers' interest in qualitative approaches has grown more extensively in recent years. For example, at the 1976 annual meeting of AERA, there were no presentations with descriptors such as case study methodology, ethnography, naturalistic inquiry or qualitative research. In 1977 there was one such presentation. In 1978 there were five; in 1979 there were eleven; in 1980 there were thirteen and this year there are nineteen.

The Problem

Most qualitative researchers keep quiet about their methods. Like historians, they sometimes say that the only way to learn to do a case study is by doing one. Their reports portray events and people with an occasional appendix or preface on problems of method. But seldom are methods described so thoroughly that one researcher can learn from another's triumphs and mistakes.

Investigators are not to blame; they, their clients, and their audiences are interested in a particular case, not the study's methodology. However, social scientists and evaluation methodologists are interested in the techniques of qualitative inquiry.

There have been some limited descriptions and analyses of how qualitative studies are done. Several authors have discussed their own experiences. See for example, anthropologists Malinowski (1922), Powdermaker

(1966), Wax (1971), and Wolcott (1973); sociologists Becker, Geer, Hughes and Strauss (1961), Spradley (1979), and Whyte (1955) and some educational researchers like Denny (1978) and Lou Smith (1979). A few authors have described or collected descriptions of other naturalistic inquirers' experiences. See for example Freilich (1970), Georges and Jones (1980), Hammond (1964), and Junker (1960). But most writings on this method are prescriptive discussions of how to do fieldwork with little reference to the experiences of people who conduct qualitative studies. Examples of these are: Filstead (1970), Glaser and Strauss (1967), Lofland (1971), McCall and Simmons (1969), Pelto and Pelto (1978), and Schatzman and Strauss (1973).

Compared to the vast literature describing and analyzing practiced methods of quantitative research (experimental, quasi-experimental, survey, etc.), very little has been done to understand the qualitative researchers' experiences. Powdermaker (1966, pp. 9-11), a noted anthropologist, summarized the problem this way:

> Field work is a deeply human as well as a scientific experience and a detailed knowledge of both aspects is an important source of data in itself, and necessary for any comparative study of methodology. Yet we know less about participant observation than about almost any other method in the social sciences. Anthropologists have written only occasionally and briefly about what actually happens in the field. Most of the discussion of the actualities of field work has been limited to private discussions between anthropologists, and these usually touch only high spots or amusing anecdotes. A scientific discussion of field work method should include considerable detail about the observer: the roles he plays, his personality, and other relevant facts concerning his position and functioning in the society studied. Now more aware methodologically, anthropologists have written a number of papers on the subject. But the number is not large and the data are limited. . .
>
> Sociologists and, increasingly, other social scientists--political scientists, social psychologists, and others--do field research, sometimes quite different and other times quite similar

> to the participant observation of the anthropologist. Always more interested in methodology, sociologists have an enormous literature on the subject, but as Robert K. Merton (1962) has noted, it is concerned with how social scientists ought to think, feel, and act and fails to give the necessary detail on what they actually do, think, and feel. Few practicing social scientists today believe their research resembles the orderly intellectual presentations in textbooks on method: choice of problem, formulation of hypotheses and testing of them, analysis and interpretation of data. All these do occur, and, obviously, research must be planned in advance. But, as Edward Shils (1957) has pointed out, the research process is often quite disorderly.
>
> Little record exists of mistakes and of learning from them, and of the role of chance and accident in stumbling upon significant problems, in reformulating old ones, and in devising new techniques, a process known as "serendipity." A lack of theory, or of imagination, an over commitment to a particular hypothesis, or a rigidity in personality may prevent a field worker from learning as he stumbles.
>
> We know little also of the feelings of the anthropologist as he continously participates, observes, and interviews, of his discouragements and pleasures, and of the possible relationship of these to the type of work he does.

The basic problem then is a lack of understanding of qualitative researchers' actions--what they do and why.

The Purpose

An impractical solution would be a detailed methodological self-study and report by each author of every case study conducted. More realistically, several outside investigations of naturalistic studies could be conducted. In keeping with the current jargon, "meta-ethnographies" or "meta-case studies" could describe techniques used by individual researchers and seek explanations or at least interpretations for the researchers' actions.

The Sample

This paper reports such an inquiry into ten case studies--The Case Studies in Science Education (CSSE)--funded as one project by the National Science Foundation in an effort to understand the current conditions in

science classrooms for students from kindergarten through high school. Organized by a team of researchers from the Center for Instructional Research and Curriculum Evaluation (CIRCE) at the University of Illinois, ten different high schools and their associated junior high and elementary schools were studied during the 1976-77 school year. The project cost just under $300,000 and took 18 months to complete. The schools, selected from sites throughout the United States, represented rural and urban schools from every major geographical region. They were racially diverse and included a wide variety of socio-economic status groups. Their proximity to a chosen qualitative researcher determined their final selection.

The field researchers were given complete freedom to use the qualitative methods of their choice. They were given little specific direction on what to look for, except to find out what was happening and what was important in science programs. A few questions or areas of concern were provided by the staff at CIRCE. Effort was made to coordinate and confirm findings across sites through the use of site-visiting teams which spent two or three days at each site and wrote reports supplementing the case reports.

The case studies themselves were very diverse. Spending anywhere from four to fifteen weeks on site, the researchers approached the investigation in different ways, selected what to observe and whom to talk to, collected information in a variety of ways and wrote their reports as short stories, novelettes, essays, summaries or ethnographies. The researchers who conducted these studies were: Terry Denny, Jacquetta Hill, Gordon Hoke, Alan Peshkin, Rudy Serrano, Louis Smith, Mary Lee Smith, Rob Walker, and Wayne Welch. Co-directors for the project were Jack Easley and Robert Stake

(1978). Describing and analyzing the details of methods used by the CSSE observers provides a public record of the character of ten examples of qualitative research. Such a record contributes to students' and researchers' understanding of what naturalistic inquiry is in practice.

Research Objectives

Objectives fall into two general categories: (1) describing what the researchers did and, (2) interpreting why they did those particular things.

The description of methods was focused on the actions of the CSSE researchers before, during and after conducting their case studies. Some of the pre-collection activities included deciding to get involved with the CSSE project, planning the study activities, determining the role they would play (e.g., participant observer, disguised observer), deciding how to establish relationships with informants, choosing techniques for gathering information, planning which material to gather and which to ignore and deciding which field work strategies would be most applicable.

A few of the researchers' activites while on site included establishing trust with informants, interviewing, observing, collecting documents, deciding whom to talk to and when to observe, creating field notes, analyzing notes and documents, blending information collection and analysis, balancing pre-conceived and spontaneous study questions, compromising to balance study objectives with political, social and time pressures and organizing collected material.

How these researchers summarized descriptions and analysis into reports and their feelings after completing the studies raised several interesting questions. For example, which strategies did the observers

feel helped them the most? How did their pre-conceived ideas affect the progress of the study? How were their methods in this study different from those used in other studies they had done? What things would they do differently? What things went on that they would probably not put in a report?

To add perspective to the description and interpretation of the researchers' activites, their personal views on methodology were gathered, addressing some of these questions: How does one's view of theory interact with practiced methods? How important are descriptive details compared to a coherent overview? How did these researchers compare what they did for the CSSE project with common methods of inquiry such as journalism, story-telling, ethnography, naturalistic inquiry, qualitative research, participant observation, fieldwork, and case study?

Research Activities

Three information gathering activities were employed in conducting the study: a literature review, analysis of documents pertaining to the CSSE project and intensive interviews, all focused on the issues discussed above. The literature review was drawn from the major literature on the methodology of naturalistic inquiry as it is discussed by members of various disciplines (e.g., sociology, anthropology). The review was done so the CSSE researchers' activites could be analyzed in light of what others have said about their experiences.

The document analysis was made of the published CSSE reports, two observers' field materials (data records), relevant reports made by these researchers for other projects, and cassette recordings of interviews and conferences held by the CSSE staff.

The major data gathering technique was a series of intensive interviews conducted with the CSSE researchers and the directors of the CSSE project during March and April 1980. An extensive analysis of the interviews was made to address the questions discussed earlier. The questions asked during these two hour interviews were based loosely on a guide which I developed through the review of literature and pilot administrations of earlier drafts of the guide to other qualitative researchers.

Analysis or interpretation was done at every stage of the study. In deciding which issues in the literature were most interesting or about which I knew the least, I selected some questions to ask the informants and deleted others. In choosing to spend two hours with each interviewer instead of one hour or several months, I restricted the scope of this study, allowing only certain possible interpretations. During the interviews, I decided which questions to follow-up to what extent with which informants. I based those decisions on a variety of criteria: the relationship between what was being said and what I had read, my awareness of my understanding of what was being said, my personal curiosities, and a host of issues of which I may never be aware.

After the literature was reviewed, interviews were conducted and the documents were collected, I sat down and began to think about how to make sense of five hundred pages of interview transcripts and over a thousand pages of documents. I was aware of two major approaches to qualitative analysis--an intuitive, descriptive, portrayal method and a more formal, structured analytical method. Because I wanted to convey the feelings I had while studying these researchers, I decided to make an intuitive

portrayal of the experiences of Lou Smith and Rob Walker. To justify the time I spent interviewing nine different researchers, I decided to do a more formal analysis also.

Describing through portrayals seemed more natural, so I did those first. I read through the transcripts of interviews with Rob Walker and Lou Smith, read other materials they had written, reviewed Walker's field materials and searched for themes that ran through their experiences. I wrote them as two seperate portrayals because they seemed best organized around different themes.

The formal analysis loomed as the major challenge of the study. I reviewed the book by Glaser and Strauss (1967) on grounding theory in data and other materials that might help me know how to begin an analysis that would account for variety and similarity among all the researchers in conjunction with the literature I had reviewed.

After several months of coding all the responses made during the interviews onto index cards, organizing them into categories, noting similarities and differences among the categories and between the researchers, and thinking about why particular responses were made, I began to write short essays to summarize their responses and my thinking. The essays were focused around central themes (e.g., developing relationships with informants, selecting classes to visit, etc.). As I wrote and re-wrote these essays, the literature I had reviewed was included and the themes began to emerge into a pattern that made sense from a holistic perspective. They fell into two large categories--descriptions of the characteristics and activities of the researchers and possible explanations for their acts. The themes further subdivided into three subcategories--

interactions between researchers and other people, research methods, and constraints on researchers. Individual themes within those categories seemed to summarize what I had learned about what the CSSE researchers did and their reasons why. Thus, the formal analysis solidified as I wrote the themes.

Major Hypothesis Derived From This Study

Time limitations preclude extensive description of the CSSE researchers' activities. This description is presented elswhere. But to summarize the results, the following conclusion may be considered the principal hypothesis derived from this study. Embodying several minor conclusions or hypotheses, it is presented for further clarification and testing in future studies.

In CSSE, the activites of naturalistic research were produced by interactions between the researchers and the cases they studied. The researchers' characteristics included their age, sex, personalities, experiences, goals, motives, methodological standards, personal equations, reference groups, sensitivities and many many other qualities.

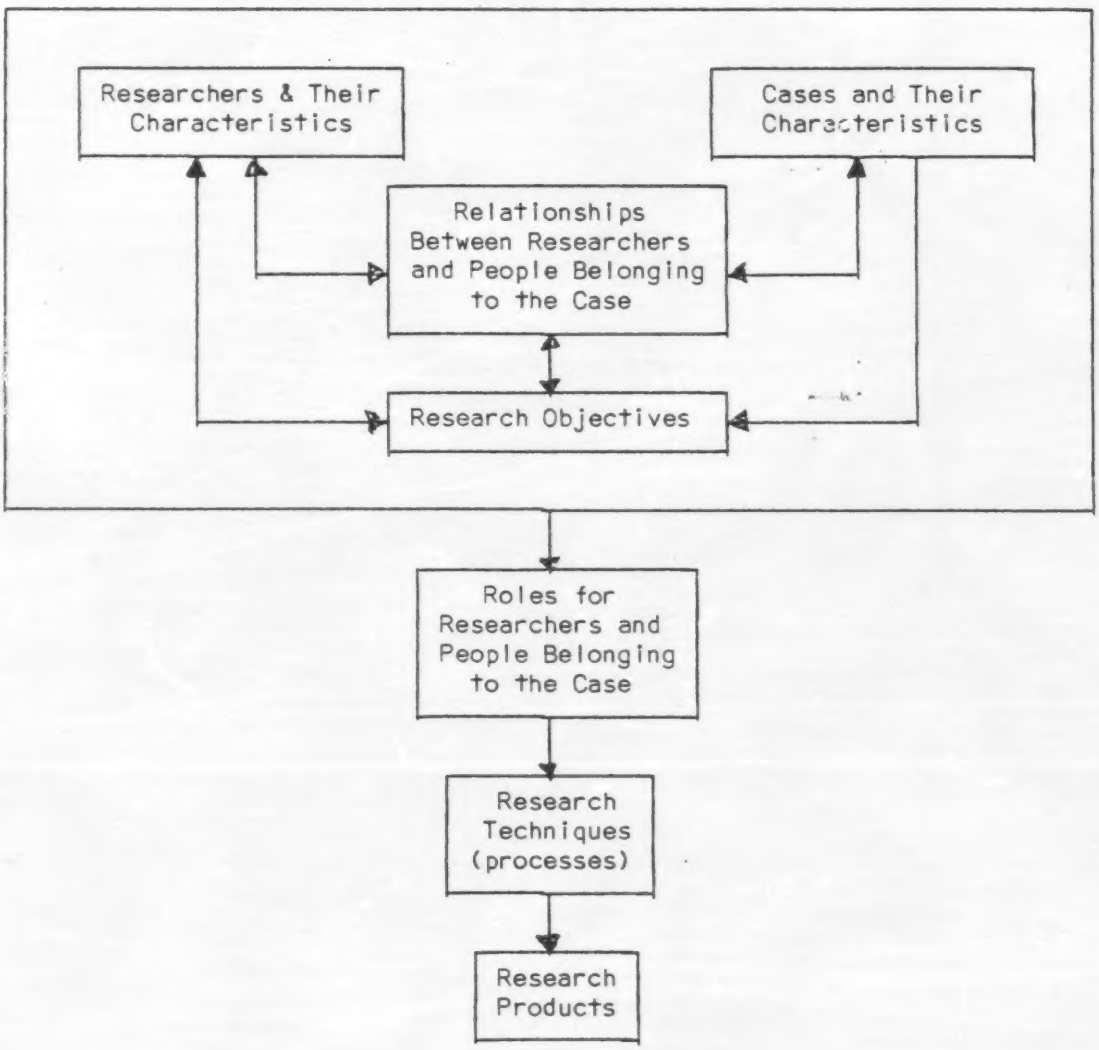
The cases were as complex as the researchers. Case characteristics included the personalities, standards, experiences and all the other personal characteristics of the individuals and groups encompassed by the cases, the project directors' expectations, NSF's official presentation of expectations in the request for proposals, the time constraints, the restrictions on report length, the emphasis on science education, the histories, climates, politics, and socio-economic structures of the communities to which the cases belonged, and so on.

Although the characteristics of the investigators and their cases interact in innumerable and complex ways, the CSSE researchers' experiences clearly suggest patterns of activity resulting from their combination. Unique relationships between researchers and people belonging to the cases evolved and case-specific research objectives were determined and refined. The relationships and objectives then interacted with each other and with the characteristics of the researchers and the cases to produce the roles filled by the researchers and people belonging to the cases. It appears that these roles determined the research techniques that could be used in the studies and techniques chosen determined the products of the research studies. This series of interactions is summarized in Figure 1.

Examples of the effects of one characteristic of researchers and two or three characteristics of cases may help illustrate this broad organization of relationships and interactions. Each researcher belonged to several difference reference groups. In their reports it appears that they addressed anthropologists, experimental researchers, future employers, and other members of the CSSE research team as well as the community of science educators. The expectations and methodoligical standards of these groups influenced the researchers to seek certain kinds of relationships in the field, to pursue particular research objectives, to assume a special research role and to use certain research techniques. Although all the reserachers demonstrated this pattern, their activites varied because they belonged to different reference groups.

From the case-side of the interaction of researcher and cases, one of the many constraints affecting the research objectives and field relationships that could evolve was the differential restriction on field

Figure 1 - Variables and interactions that determine the activities and products of naturalistic inquirers


Researchers & Their Characteristics
Cases and Their Characteristics
Relationships Between Researchers and People Belonging to the Case
Research Objectives
Roles for Researchers and People Belonging to the Case
Research Techniques (processes)
Research Products

time. Some researchers were hired to work on-site for four weeks, others for fifteen. In addition, some of the four-week sites were large school systems in complex urban settings while some of the longer studies were conducted in small relatively less complex rural communities. Combining these conditions with the researchers' differential understandings of the project directors' expectations, the expectations and personalities of the people they studied and all their researcher-based characteristics, the CSSE researchers did generate a variety of research objectives and definitions for what they were doing. They established many different kinds of relationships with people on their sites as well as unique researcher and informant roles, interesting variations in how to use similar data gathering techniques, and idiosyncratic as well as more generally observable results.

The principal hypothesis derived from the CSSE researcher's experiences, that unique ingredients lead to unique objectives, relationships, roles, procedures and results, should be qualified. Amazingly, most of these researchers remained convinced that other researchers would find the same basic results in these cases although their emphases might vary. The products of these researchers as embodied in the case reports contain many similar themes, suggesting that the project objectives influenced the creation of the individual studies' objectives to varying degrees. So, how idiosyncratic and how replicable case studies are in practice remains to be investigated in much greater depth in future studies.

Suggestions for Further Research.

This was an exploratory study, designed to begin identifying some of the issues most critical for understanding how naturalistic inquiry is done

and why researchers behave as they do. Many other studies by a variety of investigators should be done to expand and to explore the issues much more deeply. Some possible suggestions for other studies follow.

Several studies like this one could be conducted in which naturalistic inquirers from many different disciplines and projects could be interviewed and their materials studied to discover how they conduct their research and why.

More observation-based studies could be done in which the investigators would participate with the naturalistic inquirers from before the beginning of a study until after its completion. They would observe and interview the researchers and the people being studied on a daily basis in much the same way Wolcott (1973) studied the activities of a school principal.

Several more efforts like Freilich's (1970) could be made using researchers from disciplines other than cultural anthropology, focusing on how the researchers analyze and report their data after leaving the field. Freilich asked several cultural anthropologists to write essays on their methods following an outline that he prepared. The outline emphasized preparations before beginning field work and activities while in the field.

Some researchers have written about their methods and others have expressed interest in doing so. An extensive study collecting all such writings and interviewing the writers and others who have not yet written such documents could be done. The various accounts could be analyzed and perhaps synthesized to some degree to clarify issues that might not be understood in the seperate writings alone.

Most researchers save their data records and some keep diaries or journals (e.g., Malinowski, 1967). Several studies could collect these materials and make content analyses to better clarify the issues surrounding naturalistic methods.

Using these various studies, a fairly accurate description of the "logic-in-use" in naturalistic inquiry could be made. Serious efforts could begin toward the creation of alternative versions of a "restructured logic" in terms of which naturalistic procedures could be described.

Evaluation studies that employ naturalistic techniques could be investigated to see if the method is used differently than in studies which claim to seek understanding without making value judgments.

These study ideas are very general. Many investigators could profitably explore the naturalistic methodology at a more specific level. For example, the decisions made in selecting informants or what to ask during an interview or how to record field notes could all be studied in much greater depth than in this investigation. Eventually, experimental and quasi-experimental studies could be designed to test specific hypotheses and sub-hypotheses derived from these naturalistic meta-case studies.

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